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THE PHILOSOPHY

OF

LORD BACON,

AND THE

SYSTEMS

WHICH PRECEDED IT.

A LECTURE DELIVERED AT HUDDERSFIELD PHILOSOPHICAL HALL.

BY JOHN JAMES, F.S.A.,

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BRADFORD:
ABRAHAM HOLROYD, BOOKSELLER AND STATIONER,
TOP OF WESTGATE.
1860.

J. PRATT, PRINTER, ETC., SHIPLEY.

THE SCHOOL PHILOSOPHY.

To thoroughly understand the exact services Lord Bacon rendered to philosophy, it will be necessary to glance at what is termed the School Philosophy, which for three centuries, totally occupied the minds of the learned of Europe, and even to the time of Bacon greatly swayed the opinions of mankind; also to note the few, who during this long interval, followed, tho' dimly, the dictates of true science, and were messengers preparing the way for Bacon.

There are various statements respecting the time when the introduction of the Aristotelian dialectics and philosophy, into western Europe, occurred. It is sufficient for our purpose to give the generally received opinion, that the Saracens, on the conquest of Spain in the 10th century, brought the works of the Stagyrite from the East, and imparted them to the learned of the West. We have, however, proof that in the reign of the Conqueror, Lanfranc, Archbishop of Canterbury, made use of the dialectics of Aristotle, in a famous controversy respecting the Real Presence.

In that age learning was, with very rare exceptions, confined to the Ecclesiastical body. Although rhetoric, and other branches of polite literature, were known and taught to a certain extent, yet it may easily be supposed that with such men theology would become the principal study. The Scriptures, as expounded *by the Fathers*, were the object of their morning and evening meditations. Physical inquiries were considered beneath the notice of immortal man, who had been placed here, they believed, for the sole purpose of learning the will of God as revealed through the Scriptures and the Fathers. To men like these the dialectics of Aristotle, or New Philosophy, as it was called, and which spread with incredible swiftness after its first appearance in the West, became merely an instrument to be applied in expounding religion—the acute and splendid intellect of the Greek, his nice distinctions, deep reasonings, fascinated them; and henceforward the whole business of their lives seemed devoted to the elucidation of theological questions in accordance with the Aristotelian rules.

But who shall bind the mind of ever prying curious man to one pursuit, and say thus far shalt thou go and no farther! Theological pursuits had, by a false standard of merit, and the universal voice of the learned, been set up as the only objects worthy of the dignity, of the attention of man; Physical science, such as it then was, they wholly decried. The active minded of these early Schoolmen, however, kept the words of this false dictum only to the ear, and sinned against it in fact; for they extended the bounds of theology and embraced within them the whole of the available knowledge of the period, and this semi-theology, ill allied, they explained and illustrated by the subtle dialectic art of their great philosopher, and designated it "The School Philosophy." In the history of the progress of science it is a curious circumstance, that the Schoolmen, both the early and later, while professing to reverence the whole of the works of their mental chief, (whose sceptre ruled in the middle ages a wider Empire than that of his famous pupil) practically disregarded those on natural philosophy, for Aristotle had emphatically taught that all our knowledge in it, must spring from fact and observation. The Schoolmen, however, considered that abstract ideas marshalled after the manner of their art, were the sum and end of all human knowledge, whether *natural or speculative.*

It would ill accord with the space allotted to me to trace minutely the progress of the School Philosophy, else I might shew that Roscelin, an Englishman, in 1109, first enlarged the theological inquiry of the times into a more metaphysical shape, and by propounding the doctrine of universal ideas, became the founder of the famous sect of the Nominalists; that this doctrine was modified and established by the celebrated Abelard; and that afterwards it sunk into oblivion, and the opinions of the contrary sect of Realists, became universally established.

Most of my readers have heard much of the Nominalists and Realists, and it may be interesting to them if I trespass so far as to describe, in the most concise manner, the main difference between these rival sects so noted in the middle ages. The essence of their dispute was whether the human mind can form general ideas, and whether the words which are considered to convey such ideas, be not general terms representing classes of particular perceptions. As we have stated before the Nominalists had their founder in Roscelin, but indeed the dispute was old as the Grecian philosophers. Plato and Aristotle being Realists; and holding that general ideas had an objective or external reality; aud Zeno that they were merely ideas conceived by the mind. In the middle ages Thomas Aquinas and Duns Scotus were the great advocates on the Tory or Realist side; and Ockham, our countryman, revived in the later middle ages the Nominalist or Whig opinion.

The Nominalists were the liberals of those ages, and the least disposed to bow their necks to the yoke of authority either in church or secular affairs. Luther and many of the Reformers were of the Nominalist school. Before the time of Luther the Nominalists were denounced in France. The sect was, however, very numerous and thriving in Germany and it is a curious speculation whether the Reformation did not owe much to it. The question debated by the Nominalists and Realists, so far from being a frivolous one, has divided in opinion the metaphysicians of all ages, and will to the end of time continue to divide them. In later days Descartes, Locke, Reid and Kant have followed the Realists on this question, and Hobbes, Berkeley, Hume and Dugald Stewart, the Nominalists or Conceptualists.

The Schoolmen also debated much on the semi-theological questions of liberty and necessity; the Thomists, or followers of Thomas Aquinas, sustaining, after St. Augustine, the doctrines of original sin and predestination; and the Scotists, or followers of Duns Scotus, with the Pelagians, asserting the perfect liberty of the will, and that men received no imputed sin from the fall. These points were, in some respects, argued with a power and depth of reasoning, that would have done honour to Chillingworth or Edwards; only they were generally mixed with unmeaning jargon and trifling technicalities.

During this reign of the School Philosophy, poetry and polite literature were almost banished from the seats of learning. The Schoolmen derided these acquisitions; and even their Latin is the most barbarous known. The School Philosophy itself had become so debased in the 16th century, that Antony Wood, the Eulogizer of the University of Oxford, acknowledges that this Philosophy (which was the main branch of knowledge taught there) had become a system of quirks and quibbles.

Even when the revival of learning had taken place throughout Europe; when the invention of printing and the Reformation had given a mighty impulse to the intellect, the rubbish of the School only gave way slowly to healthier studies. It was (as the greatest abuses of all times have been) upheld by a large party, as the wisdom of their forefathers; prejudice, sordid interest, the reluctance of mankind to change, contributed to delay the downfal of the fabric—By degrees, however, it gave way to the better spirit of the times and crumbled down. But so slow was its fall that even in the time of Bacon the Aristotelian philosophy, with some modifications, (which we cannot stay to describe,) held the minds of the learned and the philosophers in chains.

To sum up in a few words the excellencies and the gross defects of the School Philosophy. It may easily be conceived of men spending their lives in cloisters, and exercising the faculties of the mind solely in reasoning in the dialectic form, that the reasoning faculty would be morbidly enlarged; that many persons of acute mind would (notwithstanding their barbarous phraseology, endless repetitions and minute distinctions) from time to time prove themselves deep and quick reasoners, and subtle in finding out the errors of an opponent's argument; but still they were like Olympic wrestlers of no real use and only excited admiration by their dexterity. These were their excellencies. Their defects lay in their implicit submission to the authority of their favorite philosopher, or those who had commented upon his opinions. Their attachment was to theory, not truth. Hence the mind was trammeled and dared not venture out of the hacknied course. The labours of their great authors are mere commentaries on the Aristotelian philosophy. They had no apprehension that all sound knowledge must consist of facts as aliment for the mind, and conceptions formed on those facts, but instead they seemed to consider that the human mind, aided by the dialectics of Aristotle, was able to attain to wisdom both as to the external and internal world by merely reasoning a *priori*. In truth their philosophy was one of words and notions alone, which excluded the study of nature. The greater part of their writings are subtleties contrived to support the superstitions of the times, and instead of clearing up mysteries in religion, they confused the most plain truths. It may broadly be asserted that during the whole time the School Philosophy flourished, that the human mind was in bondage in Egypt.

TRUE PHILOSOPHERS WHO PRECEDED LORD BACON.

But it will occur obviously to your minds, Did no luminaries of Science arise during these dark ages? It may be answered that some indeed appeared, but that they were merely like small tapers in wide and gross darkness, and produced no perceptible effect in enlightening it. Chemistry, in these benighted times, proved to be merely a wild pursuit—a will-o'wisp, deluding the Rosicrucians, the Theosophists, and such bewildered sects, into the greatest absurdities. The only man in this gloomy interval, who stands prominently distinguished for his services in the cause of science, is Friar Bacon, by a curious coincidence of the same name as his great successor.

Friar Bacon flourished in the middle of the 13th century. It will surprise some of my readers when I state that he was the great Reformer of philosophy in his day. In what he calls his great work (Opus Majus) he lays down this grand maxim.—"Experimental sicence, the sole Mistress of Speculative Sciences, has three great prerogatives among other parts of knowledge. 1st, Experiment tests the noblest conclusions of all other Sciences; next she discovers respecting the notions which other sciences deal with, magnificent truths, to which these sciences of themselves can by no means attain. 3rd, Her dignity is that she by her own power, and without respect of other sciences investigates the secrets of nature." These are sublime and just notions on the method of treating philosophy. His works abound in such views. Nay a very acute writer of this age, has drawn out many parallels from the writings of Friar Bacon and Lord Bacon, and attempted to prove that the latter was greatly indebted to the former. Without admitting this, the coincidences are very remarkable, and at least can only be accounted for by remembering that two great minds pursuing a similar train of thought will often coincide. I have no hesitation in observing that Friar Bacon was one of the most wonderful men the world has ever produced. He stands in the dark ages like the Pyramid in the desert which appears greater from the desolation and contrast around it. If space permitted I could shew at some length his admirable inductions from facts on the nature of the rainbow and many other subjects in natural philosophy.

We have been too much disposed to consider him a credulous monk only, but it must be remembered that credulity was the prevailing weakness of the times, and that even Kepler, Lord Bacon, and many other literary Anaks were remarkably credulous. The present age is disposed to admit more and more the merits of Friar Bacon.

On the death of Friar Bacon the light which he had held to the face of nature was quickly extinguished by the School Philosophy, and no other considerable name in science occurs for nearly two centuries. At the expiration of that period the time had arrived when the mind of man, which had as it were lain almost fallow and unproductive for centuries, and had brought forth little but the gross weeds of superstition and the vain wrangling of the schools, should be cleared from them and sown with the seeds of truth. The crop of knowledge reaped, under the circumstances, proved amazing.

Various causes had *concurred* to mark that the time was come for a total revolution in the old state of things. The revival of learning in Western Europe had set the mind of the learned at work; and philosophy, as from a long sleep, but with the vigour of a giant refreshed, arose. The invention of printing had also given a great impetus to the mental energy of the times, and lastly, the Reformation had disposed mankind to examine strictly the old theories, and judge boldly for themselves, apart from authority, in both religion and philosophy.

Among the great Reformers of science who sprung up and distinguished this period, and were the true precursors of Bacon, may first be mentioned Leonardi da Vinci, better known probably as a celebrated painter. He has, however, the greater honour of being one of the preparers of the way for the full introduction of the inductive method. In his works there are remarkable passages respecting true induction, for instance—"Theory is the General. Experiments are the soldiers. The interpreter of the artifices of nature is Experience. She is never deceived. Our judgment sometimes is deceived, because it expects effects which experience refuses to allow." Again, "We must consult Experience, and vary the circumstances till we have drawn from them general rules; for it is she who furnishes true rules. But of what use you ask are these rules? I reply that they direct us in researches of nature, and the operations of art. They prevent our imposing upon ourselves and others, by promising ourselves results which we cannot obtain," and "we must begin from the experiment and try to discover the reason." There are many similar striking passages in the same strain in his Works; and, by experiment, he also discovered many axioms in science.

Then we have Copernicus and his sublime discoveries. But one of the greatest of these reformers, is our countryman, William Gilbert, who wrote (just before Bacon) on the Magnet and the Magnetism of the Earth. In his Preface he remarks—"Since in making discoveries and searching out the hidden causes of things, stronger reasons are obtained from trustworthy experiments and demonstrable arguments than from probable conjectures, and the dogmas of those who philosophize in the usual manner, I have endeavoured to proceed from common magnetical experiments to the inward constitution of the Earth." He was both a practical and theoretical reformer. Bacon speaks slightingly of him, though his method of investigation was a purely inductive one; and so accurate that comparatively little has been added to the knowledge of Magnetism since his time.

I name, with reverence, Galileo, so well known to us all. He taught and practised the rule that natural philosophy must be sought from observations not books, theories, and the collation of the texts of ancient philosophers. Galileo's experiments shook to its foundation the Schoolmen's fabric of physics. His observations on the proper method of investigating science are characterised by great soundness of view, and a proper appreciation of the value of the true method of generalization.

One of the greatest of the founders of the true philosophy was Kepler, who from a great number of facts gathered by Tycho Brahe, by a grand induction, discovered those laws of the universe emphatically termed "Kepler's Laws," certainly among the most important discoveries ever made in astronomical science, and, as specimens of sublime generalization, not surpassed by any, if we except Newton's Theories.

I might name a host of minor philosophers who assailed the School system, and, in some instances, greatly advanced the true method of philosophy; but those mentioned suffice to shew that previous to the time of Lord Bacon a considerable advance had been made in the construction of the Temple of true science, but he is the great architect who perfected the work, or to use another simile, if he were not the first reformer of science he was (like Luther in religion) the chief of them.

LORD BACON—HIS WORKS.

Francis Lord Bacon holds in the History of Science the same high position throughout the world, which Shakespeare (at least in the English eye) occupies in Dramatic Poetry.

His character has been the subject of unexampled censure and praise. He has been termed the greatest and basest of mankind. With his faults as a man we have, in this paper, no business; though they probably admit of great extenuation, when the gross corruption and profligacy of the Court of James the 1st—unparalleled in English history—are considered. However, we may in all charity, speak of his weaknesses, when contrasted with the greatness of his intellect. Alas! poor human nature! From what a height thou didst fall in the person of Lord Bacon.

Early in life Bacon observed the defects of the system of philosophy then prevalent, and conceived the idea of introducing a better method of investigating science. He wrote, when very young, a treatise to which he gave the boasting title of the "Greatest Birth of Time." Though containing an outline of the great design he afterwards filled up, it was full of crude conceptions, such as might be expected from a young author, on so important a subject as the reformation of philosophy. The work is mentioned to shew how early he aspired to be the reformer of science, and that he confidently predicted a new era in it.

At the age of twenty-eight, (in 1605,) he published in English, his "Advancement of Learning," in which he takes a noble and extended view of the state of knowledge in all its branches, and marks its defects. This work which is the first part of what he termed his Grand Instauration of Learning, is, on account of its English dress, and the popular nature of the subject, better known to the general readers than any of his other works, except his inimitable Essays. He has in the "Advancement of Learning," ranged the subject of all human knowledge, under three great heads, namely, History, Poetry, and Philosophy. Whatever was then deficient or erroneous in each department of knowledge, in its then state, he pointed out with great learning and discernment; and shewed the means of supplying or correcting it. For such a labour he was eminently qualified, not only by his extensive and accurate knowledge of the books written before his time on all subjects he treated upon, but by the natural sagacity and shrewdness of his mind. The work was intended to reform the existing errors in philosophy, and methods of learning, which Lord Bacon seems always to have had before his eyes. The work is an accurate and severe survey of the whole intellectual world, shewing what portions had been cultivated unsuccessfully, what neglected or unknown; by what methods the unknown might be discovered and improved, and pointed out methods of correction and improvements in the whole circle of the arts and sciences.

The next and most considerable of his works is the celebrated "Novum Organon," the New Organ which stands in the second part of his Instauration. In it he offers to the world a new and better logic than that in use; not to supply arguments for controversy, but to give true methods for the attainment of every species of knowledge. He was twelve years employed in this, the greatest and most valuable, and perfect of his works. It may be divided into two parts—one on the method of avoiding error, in treating questions of politics, morals, and other branches of knowledge not *strictly* scientific. He shews how men's minds may be perverted by the prejudices of what he quaintly styles the Idols of the Tribe, of the Den, of the Forum and of the Theatre, meaning the prejudices and errors which arise from education—a particular class of reading—following favorite philosophers and theories, and so on. He very happily enumerates and guards against these sources of error. The other portion of the "Novum' is devoted to natural philosophy, and on it, as will be stated immediately, his great fame as a philosopher rests. His peculiar method of investigating the secrets of nature, his rules for avoiding false generalizations, are in this work fully and clearly laid down in the way of Aphorisms. The work was written in the Latin language, and is not generally known, but its use has of late been more prevalent, on account of having been translated.

His next work is his Sylva Sylvarum, or natural history. It is the third part of his Instauration. It is a storehouse of facts and experiments, but gathered without order or method, and is certainly the worst of

Bacon's works, and unworthy of the age of Gilbert and Galileo. Many of his "facts" prove his extreme credulity.

The 4th part of the Instauration consisted of his "Scala Intellectus," or steps by which the intellect might reach the highest point of science. One peculiar feature of Bacon's mind was his belief in the advancement of man to heights in science of which we, at present, even hardly dream. In this he follows some of the noble aspirations of the ancients. Seneca says "The day shall come when the course of time and the labour of a maturer age shall bring to light what is yet concealed—many things are reserved for ages to come when our memory shall have passed away. The world would be a small thing indeed if it did not contain matter of inquiry for *all* the world. We think ourselves initiated in the mysteries of nature when we are but in the vestibule."

The 5th and 6th parts with which he intended to complete his Instauration were never completed. He wrote also a number of small Philosophical Tracts, of a few pages each, which are not of sufficient moment to be here further alluded to. The other voluminous works of Bacon do not come within scope of this Paper, except indeed we include his Essays, which are most delightful flowers of moral philosophy.

HIS PHILOSOPHY.

Having given this mere outline of Bacon's Philosophical Works, we come to his method of *Philosophising—its originality and excellencies.*

We have seen that the Schoolmen were almost exclusively conversant with ideas considered apart from the observation of facts. When they descended, which was seldom, to investigate nature in any of her phenomena, they rushed from a few facts to a hasty generalization. Nor was this the fault of the Schoolmen alone. The great names we have mentioned as preceding Bacon were not exempt from this fault of hasty generalization. They continually spoke of the value of experience; of the necessity of observation, *in some way or other*. but they never seem to have obtained a true notion of the manner in which the observation of phenomena was to be conducted, and general truths deduced from them. "But whence" writes Bacon, "can arise such vagueness and sterility in all the physical systems which have hitherto existed in the world? It is not certainly in Nature itself: for the steadiness and regularity of the laws by which it is governed, clearly mark them out as objects of certain and precise knowledge. Neither can it arise from any want of ability in those who have pursued those inquiries, many of whom have been men of the highest talent and genius of the ages in which they lived; and it can therefore arise from nothing else but the perverseness and insufficiency of the methods that have been pursued. Men have sought to make a world from their own conceptions, and to draw from their own minds all the materials which they employed; but if, instead of doing so, they had consulted experience and observation they would have had facts and not opinions, to reason about, and might have ultimately arrived at the knowledge of the laws which govern the material world."

Bacon not only teaches that we must observe long and incessantly, and accumulate a great number of facts to make the induction as broad as possible; but he shews ***the manner*** in which the inquiry respecting them is to be conducted, and that by precise ***rule and without any guess.*** The philosophers who preceded him owed a great part of their valuable discoveries to their innate sagacity, and in many, chance and good guesses led them to the truth. They undoubtedly had no distinct idea of any method of induction in the sense in which Bacon taught it, and philosophers now understand it. He contrasts his true method of Science with the former methods, thus—"As things are at present conducted a sudden transition is made from sensible objects and particular facts to general propositions, which are accounted principles, and round which, as around so many fixed poles, disputation and argument continually revolve. From the propositions thus hastily assumed all things are derived, by a process compendious and precipitate, ill-suited to discovery, but wonderfully accommodated to debate. The way that promises success is the reverse of this. It requires that we should generalize slowly, going from particular things to those that are but one step more general; from those to others of still greater extent, and so on to such as are universal. By such means we may hope to arrive at principles, not vague and obscure, but luminous, and well defined, such as nature herself will not refuse to acknowledge."

Bacon's is an induction which not proceeding on a small enumeration of particulars, but a rigid induction which scrutinizes with care the observations and facts—examining them in all their bearings, excludes all facts and topics not strictly bearing on the object in view, and then weighing the whole, pronounces upon it. Again, he laid down, ***and that originally***, the most important rule in the inductive philosophy—the method of proceeding by ***successive inductions***, from the more complex laws of nature to the simplest. In the 19th Aphorism in his New Organ, he says, "There are two ways and can only be two of seeking and finding truth—the one from sense and particulars takes a flight to the most general axioms, and from those principles and their truth settled once for all, invents and judges of intermediate axioms. The other method collects axioms from sense and particulars, ***ascending continuously and by degrees***, so that in the end it arrives at the most general axioms. This latter is the true one, ***but hitherto untried*** method." In the process by which the immortal Newton's sublime discovery of gravitation was obtained, this rule of Lord Bacon's received a remarkable voucher for its excellence and truth. In his Optics also, where in a vast number of experiments, he analyzes the most subtle of bodies, light—and step by step, deduces the laws of optics, this method of Bacon's receives remarkable exemplification. Indeed Newton in his work on Optics, ennunciates only in different words, this method of successive induction. He says, "We proceed from particular causes to more ***general*** ones, till the argument end in the most general." But why should I particularize? modern science is one vast evidence of the importance of this method. It is its very foundation.

From time to time Bacon repeats, in the most clear and definite terms, his method of successive induction, and treats largely of the process to be pursued.

It will have been gathered that the two great features of his sysem is his broad and successive method of induction. This was the very antithesis of that which Bacon mentions as rushing at once to general principles, which he characterizes as "illicit generalization," and observes that "it is one which the intellect follows when abandoned to its own impulse, and this it does from the requisitions of logic. (Meaning the Aristotelian.) That the mind has a yearning which makes it dart forth to generalities that it may have something to rest on; and after a little dallying with experience becomes weary of it, and that these faults are augmented by logic which requires generalities to make a show with, in its disputations. Great has been the injury to science from this leaping generalization. But though these two are the main features of his method; yet it consists of a vast number of other important rules and directions, for guiding the mind in the investigation of knowledge, and most of them new, or at least not before so strictly applied to the objects of inquiry. His New Organ was in all respects a new instrument for searching into causes, and the laws of the universe; a complete and scientific system for successfully interrogating nature. He laid down and understood his system with precision.

Another feature of the Baconian philosophy is its utilitarian character. Its author seems, from his expressions, to care little for principles, however sublime, for themselves, but appears to value them merely as applicable to the purposes of life.

Nothing can give better proof of the efficacy of the method of Lord Bacon than that it has been *universally adopted* by the philosophers of modern times; his rules, divested of their technical form, have become the common guides of scientific inquiry in our times.

In physical science Bacon's method is best known and appreciated. It is, however, applicable to morals and politics, and has been well applied by many eminent writers in those departments. His writings have indeed been more quoted by the latter writers than those on physical science; but in those sciences which are not among the strict ones, its application can never be so large as in the physical sciences.

It has been alleged, most unfairly, against Bacon's system of induction, that he was neither the first person who proposed, nor the first who correctly analyzed, it; but that from the most ancient times philosophers had strongly urged the necessity of experiment for examining natural phenomena, and that in truth in the most ordinary affairs of life the inductive process is carried out. These allegations are both unjust and puerile, for the slightest investigation will shew that the boasted inductions of the ancient philosophers were, as before stated, sophistical generalizations from a few facts. True also, Adam himself followed, *in some sort*, the rule of induction, but that is merely the instinctive induction which natural sagacity enables all men, from the clown to the philosopher, to make, and is altogether different from the large and *successive* induction, leading often by a wearisome road, step by step, to the retreats of truth, which characterizes the Baconian method.

HIS DEFECTS.

I now come to the most ungracious part of my task. Happily it will in that part be short. It has generally been alleged against Bacon's philosophy that it is too much devoted to physical ideas, and that even in those he does not lay emphasis enough on the importance of the conceptualist part of the mind. He seemed to have considered, with some of the ancient philosophers, that all that is in the understanding was therefore in the senses, and that the sum of knowledge begins and ends with sense. In this, we think, he made an error, and it has been alleged by an eminent writer, Coleridge, that his philosophy led to the French school, and produced such writers as Condilliac and Condorcet.

True science consists of the gathering of facts, and employing the conceptions of the mind largely and indefatigably upon those facts. In the ideal part of philosophy he was infinitely beneath Plato. Bacon's philosophy does not give due weight to the ideal element of our knowledge. He is considered as peculiarly and eminently the asserter of experiment and observation. He is always understood to belong to the experimental as opposed to the ideal school, and is held up in contrast to Plato and others who love to dwell on that part of knowledge which has its origin in the intellect of man.

It must, however, as I have before hinted, never be forgotten that conception is no less indispensable than facts themselves, which except they be duly unfolded and applied, are collected in vain. Bacon has in some parts of his Novum Organon, put prominently forwards the necessary dependence of all our knowledge upon experience, and said little of its dependence, equally necessary, upon the conceptions which the intellect itself supplies. He seems, however, to have been fully aware of this connection, but has not treated it according to its importance.

In the methods he has given for conducting experiments (not collecting inductions from them) he completely, in many instances, failed. Witness his inquisition on the nature of heat, where he sets an example of the mode of interrogating nature. He did not in that example seem aware that we must obtain the *measure* and ascertain the *laws of phenomena* before we can discover their causes.

Another defect of his method is that he did not appreciate the *inventive sagacity* which all discovery requires. He considered that his system of induction would supersede such sagacity, (like that which Kepler and Newton in their discoveries displayed,) and deemed his rule more as a mechanical one than one requiring a display of strength of mind and inventive genius. This arose from his not seeing sufficiently the necessity of a conception which in investigation of science must be furnished by the mind in order to *bind together the facts.* This could hardly have escaped the mind of Bacon if he had cultivated sufficiently the *ideal* side of his philosephy.

I might mention other instances of defects of a less character; for in many respects his ideas seem very vague, but we must remember that this is, in most cases, where he is looking far into the depths of science; and that the mental vision is like the physical, indistinct, when applied to remote objects. He deals also too much in divisions and subdivisions. That was, however, one of the literary vices of the age.

We have thus seen how insufficient the School philosophy was for the investigation of truth, especially in physics. That it was in most a trifling philosophy, dealing in words rather than facts and ideas. I do not mean that the syllogistic method is not an admirable auxiliary to reason in tracing the connection of known truths. We have seen that many philosophers before the time of Bacon began to treat philosophy somewhat in the true method. To Bacon, however, we must give the sole credit of founding a new era in philosophy, and laying surely the foundation. Before a trifling and wrangling system prevailed, which served only to exhibit the dexterity and intellectual acumen of its professors, and produced no *fruit*. His is especially a system for the use of man, rendering all nature subject to his rule and conducing to his welfare and comfort. Being intent only on the pursuit of Truth, he discarded all disputations, and directed the inquirer to patiently follow in the track of experiment; and to beware of being misled by isolated or irrelevant facts. By the mighty power of his mind he excited the attention of the world, and gave an impulse to human progress which shall not cease until the last moment of time. His services cannot be over-estimated, even if we do not regard him as the first inventor of the true method of philosophical induction, but merely the stimulater of men to pursue the true road to Science. Even in our day his influence is continually felt; his far-seeing eye is in advance of us, and our vanguard is not yet sufficiently forward to take in the full scope of the intellectual country which he surveyed and marked out in all its divisions. To use the beautiful comparison applied to him by Cowley, he stood, like Moses on Mount Pisgah, and cast his eye over the promised land of knowledge, and believed with a mighty faith which we cannot yet understand, that in future ages men shall enter into and possess it—that men of a larger mental stature shall grow up and be able to pluck the fruit from the highest branches of the Tree of Knowledge, He believes that almost unlimited advances will, before the end of time, be made in the attainment of knowledge. Nor is this so chimerical a view, for were Bacon to revisit the realms of day, he would himself be astonished at the progress, which, through his aid, has been made in all branches of science; and if in little more than two centuries so much has been achieved, who shall say to the Advancement of Science, thus far shalt thou go and no farther!

But it was not in philosophical inquiry alone that Lord Bacon stood in his age pre-eminent. His varied and extensive powers are astonishing. He is equal to the most extensive range of intellectual vision, or the most delicate and microscopical observation. He was unquestionably the deepest philosopher, as well as the greatest wit, of his time. His style, even in that age of nervous and expressive English, is unequalled, whether we consider its beauty, its clearness, or its force. So great indeed is the fame of his universal genius, that to his pen, of late, has even been attributed, the composition of the most celebrated of Shakespeare's Plays. To him Mankind are immeasurably indebted. He removed the rubbish of the School Philosophy, and shewed to all future ages the right road to knowledge, with special directions to lead them safely on the way. In one word, the Past, Present, and Future, truly join to hail Francis Lord Bacon as the Greatest Birth of Time.